

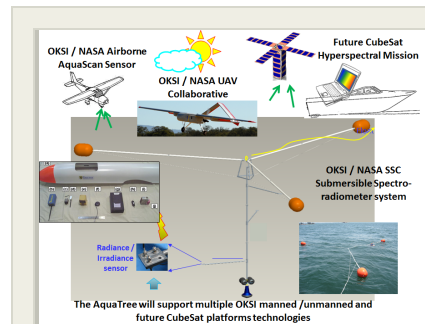
A Multi-Depth Underwater Spectroradiometer for Validation of Remotely-Sensed Ocean Color and Estimation of Seawater Biogeochemical Properties, Phase II

Completed Technology Project (2012 - 2014)



Project Introduction

A mobile-deployable, submersible multi-depth, simultaneous, spectro-radiometer system (AquaTree) was designed under phase-I, and key elements were tested in the ocean. Detailed modeling and design analysis were conducted to optimize the sensor system for the extremely wide dynamic range of the radiation field from above the surface down to 10 m below. Under Phase-II a full system will be assembled, including (i) two fiber fed spectrometers with TE cooled cameras to provide long integration time and broad dynamic range, (ii) fiber optics based radiance and irradiance collectors that feed into the spectrometers, (iii) the spectrometers housed in a watertight enclosure with multiple fiber and electrical feedthrough connectors. Control will be from a computer on board a ship located up to 300 m away to avoid shading. The system will be deployed at sea. Simultaneous validation will be conducted using other commercial radiation measuring devices and profilers, and water sampling and analysis; coordination with overhead assets (MERIS, MODIS) will provide additional measurements for complete validation of the AquaTree performance and closure for the radiative transfer modeling. The proposed work is synergistic and complementary to other oceanic research work at OKSI; including the AquaScanUVNIR-micro, an airborne hyperspectral scanner. Both the AquaScan and AquaTree cover the 350-1000 nm spectral range. The AquaScan will be flying in on manned platform and also on NASA UAV in support of ocean color, benthic diversity, biomass, and productivity of seagrass and coral reef biomes research. Another project is exploring a low-cost space access for a HyperScan-micro on board a CubeSat. Hyperspectral measurements over a long horizontal path are also conducted by OKSI to extract littoral aerosols properties.



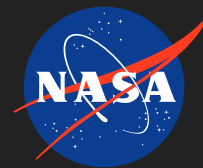
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Table of Contents

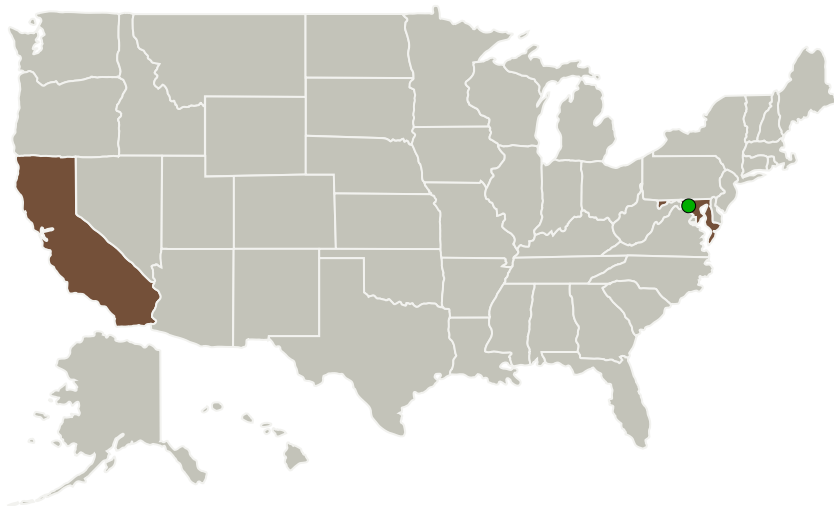
Project Introduction	1
Primary U.S. Work Locations and Key Partners	2
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Images	3
Technology Maturity (TRL)	3
Technology Areas	3
Target Destinations	3

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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Opto-Knowledge Systems, Inc.(OKSI)	Lead Organization	Industry	Torrance, California
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Opto-Knowledge Systems, Inc. (OKSI)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Nahum Gat

Primary U.S. Work Locations

California	Maryland
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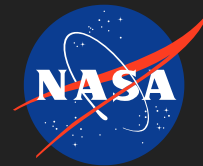
Project Transitions

▶ **September 2012:** Project Start

✓ **September 2014:** Closed out

Closeout Documentation:

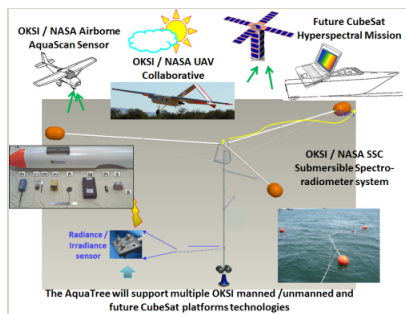
- Final Summary Chart(<https://techport.nasa.gov/file/137832>)



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Images

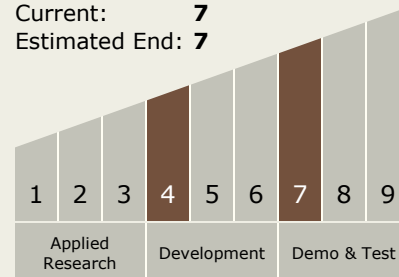


Project Image

A Multi-Depth Underwater Spectroradiometer for Validation of Remotely-Sensed Ocean Color and Estimation of Seawater Biogeochemical Properties
(<https://techport.nasa.gov/image/126868>)

Technology Maturity (TRL)

Start: 4
Current: 7
Estimated End: 7



Technology Areas

Primary:

- TX04 Robotic Systems
 - TX04.2 Mobility
 - TX04.2.4 Surface Mobility

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System